# S.Q. TUBE

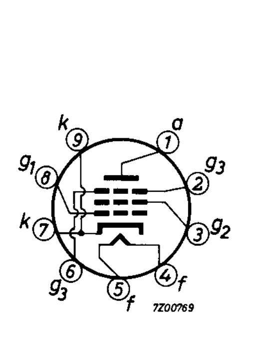
Special quality pentode designed for use as wide band output tube.

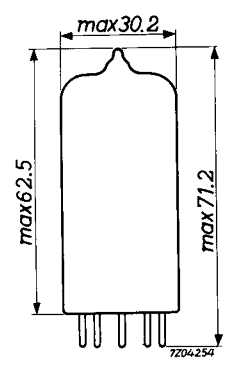
| QUICK REFERENCE DATA | | | |
|---|---|---|---|
| Life test | 10 000 hours | | |
| Low interface resistance | | | |
| Mechanical quality | Shock and vibration resistant | | |
| Base | Magnoval. Gold plated pins | | |
| Heating | Indirect<br>A.C. or D.C.; Parallel supply | | |
| Heater voltage | $V_f$ | 6.3 | V±5% |
| Heater current | $I_f$ | 600 | mA |
| Anode current | $I_a$ | 50 | mA |
| Mutual conductance | S | 45 | mA/V |

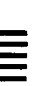
## DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Magnoval





## CHARACTERISTICS

Column I Nominal value or setting of the tube
II Range values for equipment design: Initial spread
III Range values for equipment design: End of life

| | | I | II | III | |
|---|---|---|---|---|---|
| Heater voltage | $V_f$ | 6.3 | | | V |
| Heater current | $I_f$ | 600 | | | mA |
| Anode voltage | $V_a$ | 125 | | | V |
| Grid No.3 voltage | $V_{g_3}$ | 0 | | | V |
| Grid No.2 voltage | $V_{g_2}$ | 125 | | | V |
| Grid No.1 voltage | $-V_{g_1}$ | 3 | | | V |
| Anode current | $I_a$ | 50 | | | mA |
| Grid No.2 current | $I_{g_2}$ | 5.5 | | | mA |
| Mutual conductance | S | 45 | | | mA/V |
| Internal resistance | $R_i$ | 20 | | | kΩ |
| Amplification factor | $\mu_{g_2g_1}$ | 30 | | | |
| Input resistance | $R_{g_1}$ | 1 | | | kΩ |
| Frequency = 50 MHz | | | | | |
| Anode supply voltage | $V_{ba}$ | 140 | | | V |
| Grid No.3 voltage | $V_{g3}$ | 0 | | | V |
| Grid No.2 supply voltage | $V_{bg_2}$ | 140 | | | V |
| Grid No.1 supply voltage | $+V_{bg_1}$ | 12 | | | V |
| Cathode resistor | $R_k$ | 270 | | | Ω |
| Anode current | $I_a$ | 50 | 48 - 52 | | mA |
| Grid No.2 current | $I_{g_2}$ | 5.5 | 4.5 - 6.5 | | mA |
| Grid No.1 to cathode voltage | $-V_{g_1k}$ | 3.0 | 2.3 - 3.7 | 1.8 | V |
| Mutual conductance | S | 45 | 38 - 52 | ΔS = max.25% | mA/V |
| Negative grid current | $-I_g$ | | | 2 | μA |

## CHARACTERISTICS (continued)

As triode (grid No.2 connected to anode)

| | | I | |
|---|---|---|---|
| Anode voltage | $V_a$ | 125 | V |
| Grid No.1 voltage | $-V_{g_1}$ | 3 | V |
| Anode current | $I_a$ | 55.5 | mA |
| Mutual conductance | S | 50 | mA/V |
| Internal resistance | $R_i$ | 600 | Ω |
| Amplification factor | $\mu$ | 30 | |



## CAPACITANCES

Pentode connected

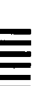
| | | I | II | I | II | |
|---|---|---|---|---|---|---|
| | | With shield | | Without shield | | |
| Anode to grid No.3, grid No.2, cathode and heater | $C_{a/g_3g_2kf}$ | 6.5 | 5.8 - 7.2 | 4.0 | 3.6 - 4.4 | pF |
| Grid No.1 to grid No.3, grid No.2, cathode and heater | $C_{g_1/g_3g_2kf}$ | 18 | 15 - 21 | 18 | 15 - 20 | pF |
| Grid No.1 to grid No.3, grid No.2, cathode and heater Cathode current $I_k$ = 55.5 mA | $C_{g_1/g_3g_2kf}$ | 28 | | 28 | | pF |
| Anode to grid No.1 | $C_{ag_1}$ | 80 | max. 120 | 110 | max. 150 | mpF |

Triode connected (grid No.2 connected to anode)

| | | I | II | I | II | |
|---|---|---|---|---|---|---|
| Anode to grid No.3, cathode and heater | $C_{a/g_3kf}$ | 10.5 | 9.4-11.6 | 7.8 | 7.0 - 8.6 | pF |
| Grid No.1 to grid No.3, cathode and heater | $C_{g_1/g_3kf}$ | 11.8 | 10-13.6 | 11.8 | 10-13.6 | pF |
| Anode to grid No.1 | $C_{ag_1}$ | 6.2 | 5.5 - 6.9 | 6.3 | 5.6 - 7.0 | pF |
| Cathode to heater | $C_{kf}$ | 6.0 | | 6.0 | | pF |

## SHOCK AND VIBRATION RESISTANCE

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.



Shock

The tube is subjected 5 times in each of 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of 30°.

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

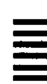
## LIMITING VALUES (Absolute max. rating system)

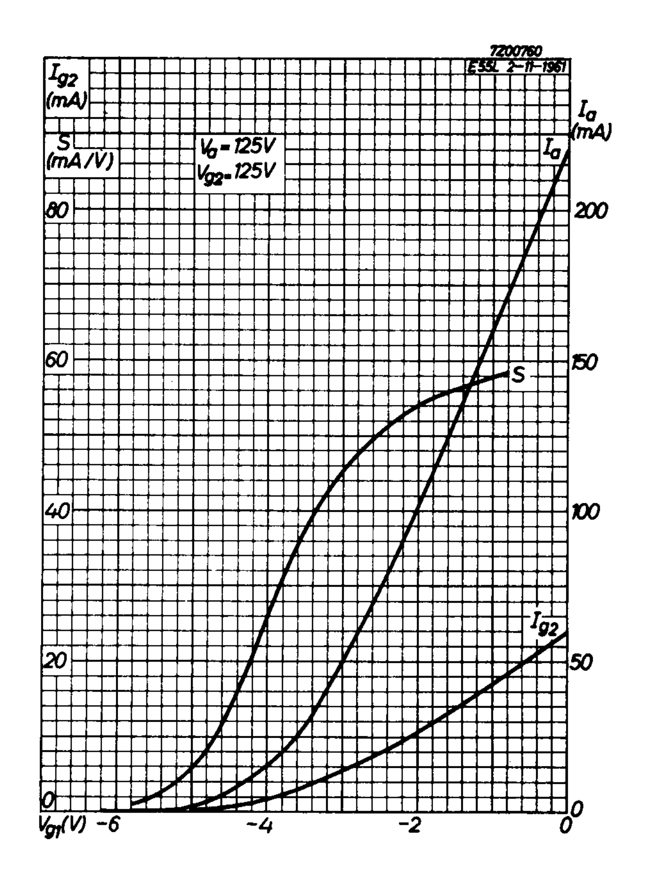
| | | | | |
|---|---|---|---|---|
| Anode voltage | $V_{a_o}$ | max. | 400 | V |
| | $V_a$ | max. | 200 | V |
| Anode dissipation | $W_a$ | max. | 10 | W |
| Grid No.2 voltage | $V_{g_{2o}}$ | max. | 350 | V |
| | $V_{g_2}$ | max. | 175 | V |
| Grid No.2 dissipation | $W_{g_2}$ | max. | 1.5 | W |
| Grid No.1 voltage, negative | $-V_{g_1}$ | max. | 55 | V |
| positive | $V_{g_1}$ | max. | 0 | V |
| Cathode current | $I_k$ | max. | 75 | mA |
| Grid No.1 resistor | $R_{g_1}$ | max. | 125 | kΩ |
| Voltage between cathode and heater | $V_{kf}$ | max. | 200 | V |
| Bulb temperature | $t_{bulb}$ | max. | 180 | °C |

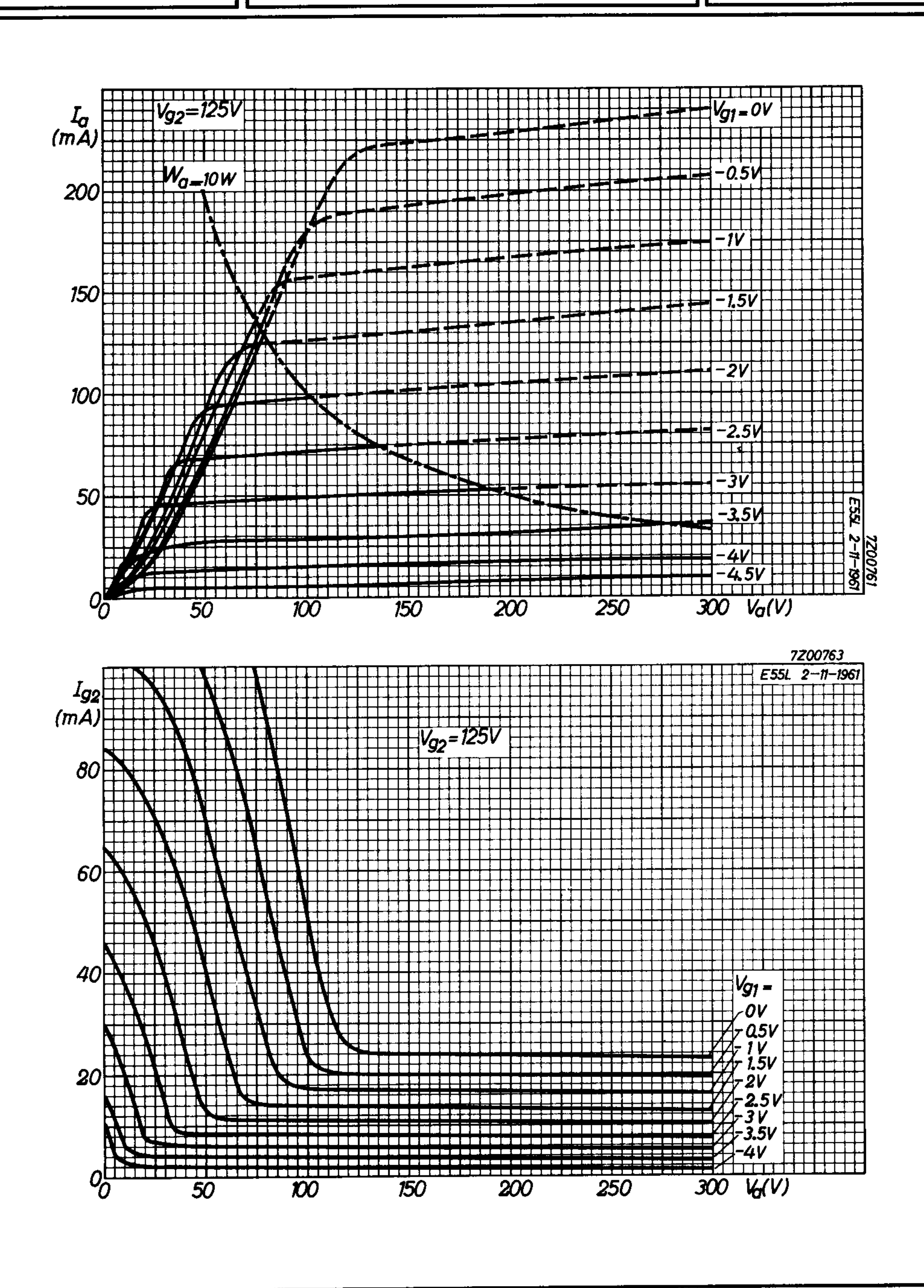
In applications where a long life is not required, $I_k$ max. can be increased to 100 mA and $t_{bulb}$ max. to 220 °C

**OPERATING CONDITIONS**

| | | | |
|---|---|---|---|
| Anode supply voltage | $V_{ba}$ | 140 | V |
| Grid No.2 supply voltage | $V_{bg_2}$ | 140 | V |
| Grid No.3 voltage | $V_{g_3}$ | 0 | V |
| Grid No.1 supply voltage | $+V_{bg_1}$ | 12 | V |
| Cathode resistor | $R_k$ | 270 | Ω |
| Anode current | $I_a$ | 50 | mA |
| Grid No.2 current | $I_{g_2}$ | 5.5 | mA |
| Mutual conductance | S | 45 | mA/V |







$I_a$ (mA)
$V_{g2}$=125V
$W_a$=10W
$V_{g1}$=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
-4V
-4.5V
$V_a$(V)
7Z00761
E55L 2-11-1961
7Z00763
E55L 2-11-1961
$I_{g2}$ (mA)
$V_{g2}$=125V
$V_{g1}$=
0V
0.5V
1V
1.5V
2V
2.5V
3V
3.5V
-4V
$V_a$(V)



7Z04432-5.ee.12

$V_a$ =125V
$V_{g2}$=100V

$I_a$ (mA): 200, 150, 100, 50, 0

S (mA/V): 80, 60, 40, 20, 0

$I_{g2}$ (mA): 20, 10, 0

$V_{g1}$ (V): 0, −2, −4, −6

$I_a$, S, $I_{g2}$

7Z00762 E55L 2-11-1961

$V_a$=125V

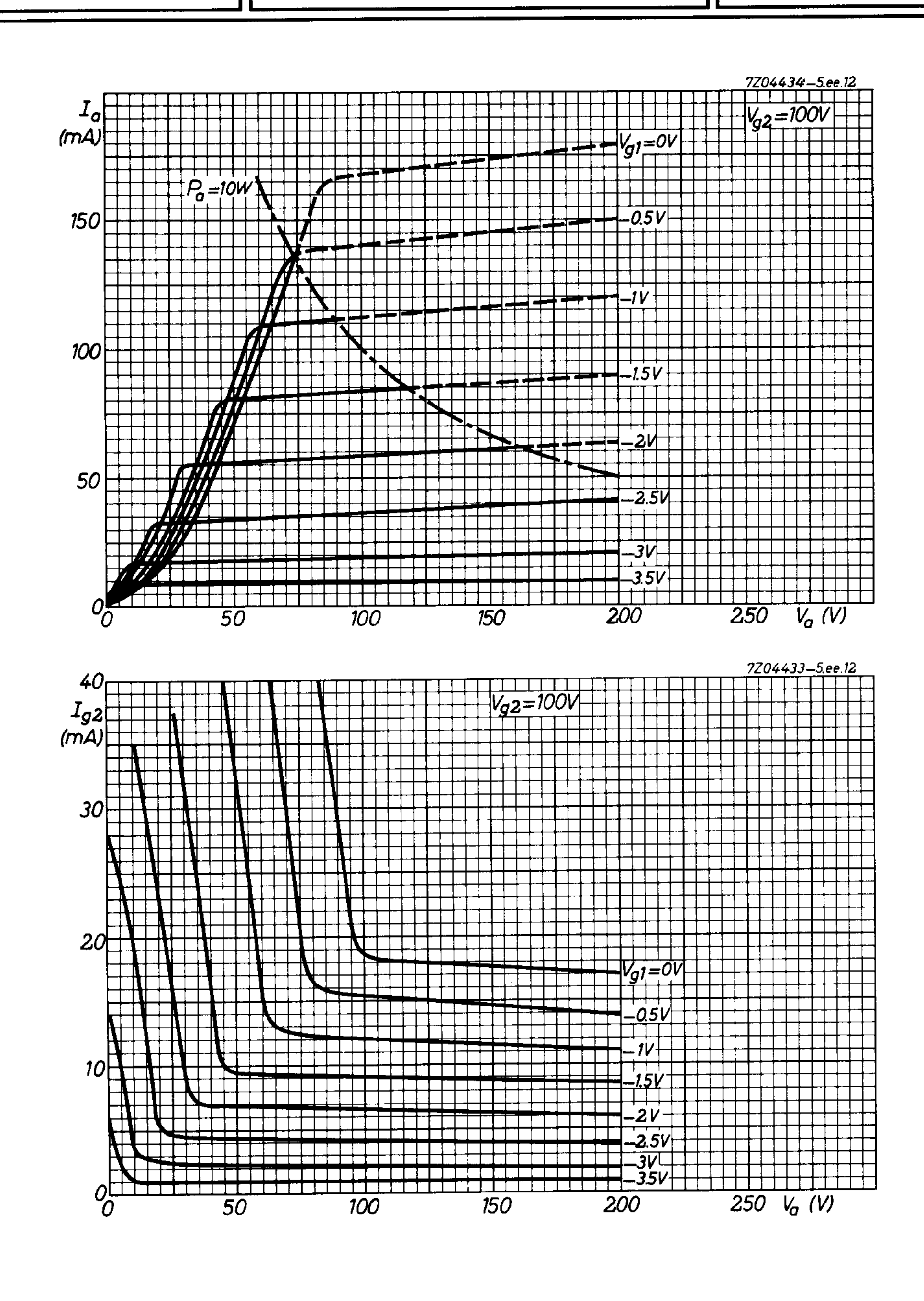
$I_a$, $V_a$, $V_{g1}$

$I_a$ (mA): 250, 200, 150, 100, 50, 0

S (mA/V): 100, 80, 60, 40, 20, 0

$V_{g1}$ (V): 0, −2, −4, −6

$I_a$, S


7Z04434-5.ee.12
$I_a$ (mA)
$V_{g2}$=100V
$V_{g1}$=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
$P_a$=10W
0
50
100
150
200
250
$V_a$ (V)
7Z04433-5.ee.12
$I_{g2}$ (mA)
40
30
20
10
$V_{g2}$=100V
$V_{g1}$=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
0
50
100
150
200
250
$V_a$ (V)



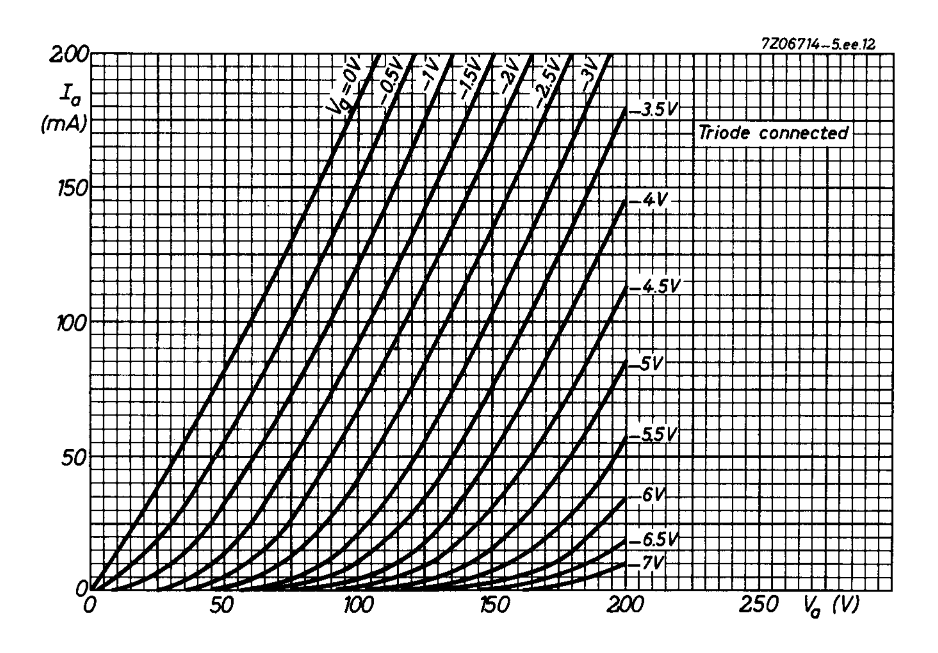
7Z04435-5.ee.12

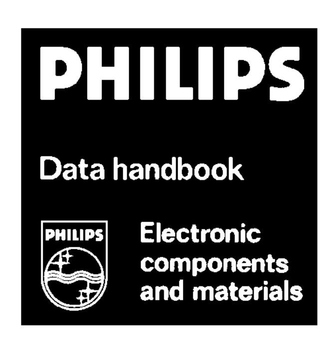
$V_a = 125V$

7Z06713-5.ee.12

Triode connected

$V_a = 200V$, 175V, 150V, 125V, 100V, 75V, 50V


7Z06714-5.ee.12
200
$I_a$
(mA)
150
100
50
0
0
50
100
150
200
250
$V_a$ (V)
$V_g$=0V
-0.5V
-1V
-1.5V
-2V
-2.5V
-3V
-3.5V
-4V
-4.5V
-5V
-5.5V
-6V
-6.5V
-7V
Triode connected




**E55L**

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